

CURRICULUM VITAE

Joseph L. Cecchi
Dean of the School of Engineering
Professor of Chemical and Nuclear Engineering
University of New Mexico
Albuquerque, NM

EDUCATION

B.A., Physics, (Magna cum Laude) Knox College, 1968
M.A., Physics, Harvard University, 1969
Ph.D., Physics, Harvard University, 1972

APPOINTMENTS IN TEACHING AND RESEARCH

1994 - present Professor of Chemical and Nuclear Engineering
University of New Mexico
1988 - 1994 Lecturer with Rank of Professor, Department of Chemical Engineering
Princeton University
1986 - 1988 Lecturer, Department of Chemical Engineering
Princeton University
1984 - 1994 Principal Research Physicist, Plasma Physics Laboratory
Princeton University
1978 - 1984 Research Physicist, Plasma Physics Laboratory
Princeton University
1972 - 1978 Staff Physicist, Plasma Physics Laboratory
Princeton University
1969 - 1972 Research Assistant to Professor Norman F. Ramsey
Department of Physics, Harvard University
1969 - 1972 Teaching Fellow, Department of Physics
Harvard University
1967 - 1968 Research Associate, Physics Division
Argonne National Laboratory

ACADEMIC ADMINISTRATIVE POSITIONS

2001- present Dean, School of Engineering
University of New Mexico
2004 - present Chair, Board of Directors
The Science and Technology Corporation @ UNM
2000 - 2001 Interim Dean, School of Engineering
University of New Mexico
1994 - 2000 Chair, Department of Chemical and Nuclear Engineering
University of New Mexico

- 1991 - 1994 Director, SEMATECH Center of Excellence for Plasma Etching
New Jersey Consortium
- 1987 - 1994 Director, Graduate Program in Plasma Science and Technology
School of Engineering, Princeton University
- 1979 - 1987 Head, Materials Physics Group, Plasma Physics Laboratory
Princeton University
- 1987 - 1994 Head, Plasma Processing Group, Plasma Physics Laboratory
Princeton University

COURSES TAUGHT AND DEVELOPED

Princeton University

- ChE 346 *Chemical Engineering Laboratory*
- ChE 417 *Plasmas for Chemical Processing of Materials* (newly developed)
- ChE 422 *Semiconductor Processing Technology*
- ChE 441 *Chemical Reactor Engineering*
- ChE 444 *Special Topics in Chemical Engineering and Technology*
- ChE 454 *Senior Thesis*
- ChE 551 *Topics in Plasma Science and Technology* (new course)

University of New Mexico

- ChNE 461 *Chemical Reactor Engineering*
- ChNE 486/586 *Statistical Design of Experiments for Semiconductor Manufacturing* (newly developed)
- ChNE 515 *Special Topics*
- ChNE 599 *Masters Thesis*
- ChNE 699 *Dissertation*
- ME 461 *High Performance Engines* (newly developed)

UNDERGRADUATE RESEARCH SUPERVISED

Princeton University (Chemical Engineering)

Michael R. Grillo (B.S., 1993), *An Historical Account of the Search for the Structure of Fullerenes*

Craig H. Boyce (B.S., 1994), *Mechanisms for Anisotropic Reactive Ion Etching of Photoresist via O_2 , N_2/O_2 , and SO_2/O_2 Plasmas*

University of New Mexico (Chemical Engineering)

Frank B. Lopez, (1995), *Design of Experiments for Optimization Study of Oxide Etch*

James J. Chambers, (1995), *Optimization of a Plasma Etch Process Utilizing Statistical Design and Analysis of Experiments with Response Surface Methodology*

Jennifer Drez, (1996,) *Modeling the Growth of a CF_x Polymer on Silicon Wafers*

David L. Temer, (1996), *A Correlation Between CF_x In the Plasma Environment To Index of Refraction*

Zachary J. Walster, (1996), *Polymer Deposition for Selective Oxide Etching Using HFC-134a*

Tara Martinez, (1997), *The Characterization of Si Wafers Using A Scanning Electron Microscope*

Stacy Dunivan, (1997), *Statistically Designed Experiment to Determine Defect Generation of a Lithographic Process*

Jason Bradley, (1998), *Optimization of Chemical Mechanical Planarization*

Karla Waters, (1998), *Parameter Space for Oxide Etching Using the Lucas Labs Cluster Tool*

GRADUATE RESEARCH SUPERVISED

Princeton University (Chemical Engineering, unless otherwise noted)

Shashank Chattervedi (PhD, 1989), *Energy Flows in a Quasi-Isobaric Fusion-Fission Hybrid Reactor*

James Cross (MS, 1990), *Introductory Survey of Modeling Strategies for Process Plasmas*

Dwani Vyas (MS, 1991), *Global Modeling of the Electron Cyclotron Resonance Reactor*

Mark Bannister (Astrophysical Sciences, PhD, 1992), *A Surface Wave Sustained Plasma Source of Supersonic Nozzle Beams of Metastable Argon Atoms (the "Surfajet")*

C.W. Cheah (PhD, 1993), *Plasma Diagnostics for the Characterization of Etching and Deposition Reactors*

Chris Zuiker (Astrophysical Sciences, PhD, 1993), *Laser-Induced Fluorescence Measurements in an Electron Cyclotron Resonance Plasma Etch Reactor*

Y-C Huang (PhD, 1994), *Characterization of Surface Reaction During SF₆ Etching of Silicon in an Electron Cyclotron Resonance (ECR) Plasma Reactor*

Rob Goheen (MS, 1995), *In-Situ Analysis of A Plasma Deposited Polymer Film in a CF₃H Discharge Using Reflection Infrared Spectroscopy*

Rob Jarecki (PhD, 1996), *Low Temperature Sulfur Hexafluoride Plasma Etching of Silicon/Silicon Dioxide in an Electron Cyclotron Resonance Reactor*

Mark Sowa (PhD, 1998), *Mechanism for the Selective Etch of Silicon Dioxide in a High-Density, Low-Pressure, Inductively Coupled Fluorocarbon Plasma*

Served on an additional 5 PhD thesis committees

University of New Mexico (Chemical Engineering, unless otherwise noted)

Vinay Pohray (MS, 1997), *Role of Polymer Growth and Ion Bombardment of Selective Oxide Tech Chemistry in an Inductively Coupled Plasma Reactor*

Craig Brown (MS, 1998), *Plasma Polymerized Fluorocarbon (CHF₃) Thin Films Optimization and Characterization for the Elimination of Post Release Adhesion in Polysilicon Microstructures*

David Stein (PhD, 1998), *Mechanistic, Kinetic, and Processing Aspects of Tungsten Chemical Mechanical Polishing*

Michael Littau (MS, 1998), *Wavelength Modulated Infrared Diode Laser Absorption Spectroscopy of Fluorocarbon Species in a Low-Pressure, High-Density Plasma Reactor*

Iyano Inoue (MS, 1999), *Applications of Infrared Diode Laser Absorption Spectroscopy to Measurements of Dissociation Kinetics and Calibration of Actinometric Optical Emission Spectroscopy*

Prabhakar Gopoldasu (MS, 2000), *Response Surface Modeling of the Composition of AlAsSb Alloys Grown by Molecular Beam Epitaxy*

Yong Xiang Guo (MS, 2001), *Modeling of a Fluorocarbon-based Process for Selective Etching of Interlevel Dielectrics*

Amy Moy (MS, 2001), *Polishing Pad Degradation and Wear Due to Tungsten and Oxide CMP*

Todd Bauer (PhD, 2001), *Fluorocarbon Radical Density Measurements in an Inductively Coupled Plasma Reactor*

Stacy Stone (Manufacturing Engineering, ME, 2002), *Feasibility of Printing 185 nm Nested Contact Holes at 320 nm Pitch with a 0.60 NA 248 nm KrF Lithography Source*

Xiaomei Wu (PhD, 2003), *Study of Rotational Temperature and Loss Mechanisms of Fluorocarbon Radicals in an Inductively Coupled Plasma Reactor*

Ying-Bing Jiang (PhD, 2005), *Plasma-Assisted Atomic Layer Deposition of Conformal Nano Cap Layers on Self-Assembled Mesoporous Low-k Dielectrics*

Keith Green (MS, 2006) *Polysilicon Gate Etch CD Bias Characterization*

Amy Moy (PhD, in progress) *Topics in Chemical Mechanical Planarization*

Served on an additional 7 MS and 11 PhD graduate student committees

SELECTED UNIVERSITY SERVICE (2000 – present)

- Chair, UNM Strategic Planning Task Force (2006-07)
- Chair, Dean of the College of Arts and Sciences Search Committee (2006-07)
- Member, Search Committee for the Provost and Executive Vice President for Academic Affairs (2005 - 2006)
- Member, Business and Industry Cabinet (2005 – present)
- Member, Economic Development Advisory Council (2005 – present)
- Member, Research & Economic Development Collaboration Council (2005 – present)
- Chair, Board of Directors, The Science and Technology Corporation at the University of New Mexico, (2004 – present)
- Member, President's Leadership Roundtable (2004 – present)
- Chair, Comprehensive Evaluation Committee for the Dean of Education (2004-05)
- Member, Faculty Dispute Resolution Advisory Board (2003 – present)
- Member, UNM Planning Council (2003 – present)
- Member, Federal Priorities Group (2002 – present)
- Member, UNM Presidential Search Committee (2002-03)
- Member, UNM Rankings Committee (2002-04)
- Member, Board of Directors, The Science and Technology Corporation at the University of New Mexico, (2001 – present)
- Member, UNM Urban Agenda Task Force (2001 – 02)
- Chair, Dean of the College of Fine Arts Search Committee (2001-02)
- Member, UNM Council of Deans (2000-present)
- Member, UNM Strategic Planning Task Force, (2000 – 01)

RESEARCH EXPERTISE

- Micro- and nano-fabrication for semiconductor devices and interconnects
- Plasma etching and plasma etch tools (Parallel Plate, RIE, ECR, ICP, TCP, Helicon)
- Plasma diagnostics: RF measurements, optical emission, laser induced fluorescence, diode laser absorption spectroscopy, microwave interferometry
- Chemical Vapor Deposition (CVD) and Plasma-Enhanced CVD (PECVD)
- Micro-Electro Mechanical Systems (MEMS)

- Chemical-Mechanical Planarization (CMP)
- Atomic Layer Deposition (ALD) and Plasma-Assisted ALD (PA-ALD)
- Molecular beam electric resonance measurements of rotational magnetic moments and hyperfine structure of diatomic molecules
- Plasma physics, Plasma Transport, Plasma-materials interactions
- Vacuum ultraviolet spectroscopy
- Beam foil spectroscopy/vacuum ultraviolet spectroscopy of highly stripped atoms
- Interaction of hydrogen and deuterium with Zr-alloy bulk getter
- Polarization of atomic hydrogen by optical pumping and spin exchange
- Plasma-excited supersonic atom sources (Ar, He) for metastable and reactive beam generation

PUBLICATIONS

Stability and Heating Experiments on the ATC Tokamak, K. Bol, J. L. Cecchi, C. C. Daughney, R. A. Ellis, H. P. Eubank, H. P. Furth, R. A. Jacobsen, L. C. Johnson, E. Mazzucato, and W. Stodiek, Proceedings of the Sixth European Conference on Controlled Fusion and Plasma Physics (Joint Institute for Nuclear Research, Moscow, 1973) Vol. I, p.18-21.

Molecular Zeeman Spectra of ${}^6,7\text{Li}$ ${}^{79,81}\text{Br}$, J. L. Cecchi and N. F. Ramsey, J. Chem. Phys. **60**, 53-65 (January 1974).

Neutral-Beam Heating in the Adiabatic Toroidal Compressor, K. Bol, J. L. Cecchi, C. C. Daughney, R. A. Ellis, H. P. Eubank, H. P. Furth, R. J. Goldston, H. Hsuan, R. A. Jacobsen, E. Mazzucato, R. R. Smith, and T.H. Stix, Phys. Rev. Lett. **32**, 661-664 (March 1974).

Neutral-Beam Heating in the Adiabatic Toroidal Compressor, K. Bol, J. L. Cecchi, C. C. Daughney, R. A. Ellis, H. P. Eubank, H. P. Furth, R. J. Goldston, H. Hsuan, E. Mazzucato, R. R. Smith, and P. E. Stott, Proceedings of the Fifth International Conference on Plasma Physics and Controlled Nuclear Fusion Research (International Atomic Energy Agency, Vienna, 1975) Vol. I, p. 77-82.

Experiments on the Adiabatic Toroidal Compressor, K. Bol, J. L. Cecchi, C. C. Daughney, F. DeMarco, R. A. Ellis, H. P. Eubank, H. P. Furth, H. Hsuan, E. Mazzucato, and R. R. Smith, Proceedings of the Fifth International Conference on Plasma Physics and Controlled Nuclear Fusion Research (International Atomic Energy Agency, Vienna, 1975) Vol. I, p. 83-97.

Transport of Injected Impurities in ATC, S. A. Cohen, E. S. Marmor, and J. L. Cecchi, Proceedings of the Seventh European Conference on Controlled Fusion and Plasma Physics (Centre de Recherches en Physique des Plasmas, Ecole Polytechnique, Lausanne, 1975) Vol. I, p. 137.

System for Rapid Injection of Metal Atoms Into Plasmas, E. S. Marmor, J. L. Cecchi, and S. A. Cohen, *Rev. Sci. Instrum.* **46**, 1149-1154 (September 1975).

Impurity Transport in Quiescent Tokamak Plasma, S. A. Cohen, J. L. Cecchi, and E. S. Marmor, *Phys. Rev. Lett.* **35**, 1507-1510 (December 1975).

Intensity Modulations in the Decay of the $3^2P_{1/2}^0$ Level in the Sodium-Like Ion, Cu^{18+} , D. J. Pegg, P. M. Griffin, B. M. Johnson, K. W. Jones, J. L. Cecchi, and T.H. Kruse, *Phys. Rev. Lett.* **38**, 1471-1473 (June 1977).

Radiative Lifetimes of the Low-Lying Levels of Na-Like Copper, D. J. Pegg, P. M. Griffin, B. M. Johnson, K. W. Jones, J. L. Cecchi, and T. H. Kruse, *Phys. Rev. A* **16**, 2008-2010 (November 1977).

Sputtering and Surface Damage of TFTR Protective Plate Candidate Materials by Energetic D^+ Irradiation, M. Kaminsky, K. S. Das, and J. L. Cecchi, *Fusion Technology* (Pergamon Press, Oxford, 1979) Vol. 2, p. 789-794.

Tritium Permeation and Wall Loading in the TFTR Vacuum Vessel, J. L. Cecchi, *J. Vac. Sci. Technol.* **16**, 58-70 (January/February 1979).

Spectra From Foil-Excited Molybdenum Ions, B. M. Johnson, K. W. Jones, J. L. Cecchi, and T. H. Kruse, *IEEE Trans. Nucl. Sci.* **NS-26**, 1317-1319 (February 1979).

Comparison of Tungsten and Gold Radiation From Beam-Foil Excitation and Tokamak-Produced Plasmas, B. M. Johnson, K. W. Jones, J. L. Cecchi, E. Hinnov, and T. H. Kruse, *Phys. Lett.* **70A**, 320-322 (March 1979).

Surface Damage and Sputtering of ATJ Graphite as Candidate Material for TFTR Under D^+ Bombardment, S. K. Das, M. Kaminsky, R. Tishler, and J. L. Cecchi, *J. Nucl. Mater.* **85/86**, 225-230 (December 1979).

The ISX Graphite Limiter Experiment, R. A. Langley, R. J. Colchin, R. C. Isler, M. Murakami, J. E. Simpkins, J. L. Cecchi, V. L. Corso, H. F. Dylla, R. A. Ellis, and M. Nishi, *J. Nucl. Mater.* **85-86**, 215-219 (December 1979).

Transient Getter Scheme for the Tokamak Fusion Test Reactor, J. L. Cecchi, S. A. Cohen, and J. J. Sredniawski, *J. Vac. Sci. Technol.* **17**, 294-297 (January/February 1980).

EUV Spectra of MoXIV to MoXXIX, B. M. Johnson, K. W. Jones, J. L. Cecchi, and T. H. Kruse, *Phys. Lett.* **78A**, 61-64 (July 1980).

PDX Divertor Operation, D. K. Owens, V. Arunasalam, C. Barnes, M. G. Bell, K. Bol, S. A. Cohen, J. L. Cecchi, C. C. Daughney, S. L. Davis, D. L. Dimock, H. F. Dylla, P. C. Efthimion, R. J. Fonck, B. Grek, R. J. Hawryluk, E. Hinnov, H. Hsuan, M. Irie, R. A. Jacobsen, D. W. Johnson, H. Maeda, D. K. Mansfield, E. Mazzucato, K. McGuire, D. M. Meade, D. Mueller, M. Okabayashi, G. L. Schmidt, J. A. Schmidt, E. H. Silver, J. C.

Sinnis, P. Staib, J. D. Strachan, S. Suckewer, F. H. Tenney, and M. Ulrickson, *J. Nucl. Mater.* **93/94**, 213-219 (October 1980).

Impurity Control in TFTR, J. L. Cecchi, *J. Nucl. Mater.* **94/95**, 28-43 (October 1980).

Thermal Testing of Coated Materials for Limiters and Protective Plates in the Tokamak Fusion Test Reactor, M. Ulrickson and J. L. Cecchi, *J. Thin Solid Films* **73**, 133-138 (November 1980).

Tracer Element Injection Into PDX Tokamak for Spectral Line Identification and Localized Doppler Temperature Measurements, S. Suckewer, J. L. Cecchi, S. A. Cohen, R. J. Fonck, and E. Hinnov, *Phys. Lett.* **80A**, 259-262 (December 1980).

PDX Experimental Results, D. M. Meade, V. Arunasalam, C. Barnes, M. G. Bell, M. Bitter, K. Bol, R. Budny, J. L. Cecchi, S. A. Cohen, C. C. Daughney, S. L. Davis, D. L. Dimock, H. F. Dylla, P. C. Efthimion, H. P. Eubank, R. J. Fonck, R. Goldston, B. Grek, R. J. Hawryluk, E. Hinnov, H. Hsuan, M. Irie, R. A. Jacobsen, D. W. Johnson, L. C. Johnson, H. W. Kugel, H. Maeda, D. K. Mansfield, R. T. McCann, D. C. McCune, K. McGuire, D. R. Mikkelsen, S. Milora, D. M. Manos, D. Mueller, M. Okabayashi, D. K. Owens, M. F. Reusch, K. Sato, N. R. Sauthoff, G. L. Schmidt, E. H. Silver, J. C. Sinnis, J. D. Strachan, S. Suckewer, H. Takahashi, and F. H. Tenney, *Proceedings of the Eighth International Conference on Plasma Physics and Controlled Nuclear Fusion Research (International Atomic Energy Agency, Vienna, 1981) Vol. I*, p. 665-676.

The Design and Test Results of an In-Torus Zirconium/Aluminum Getter Pump System for PDX, J. J. Sredniawski, J. L. Cecchi, and H. F. Dylla, *Proceedings of the 9th Symposium on Engineering Problems of Fusion* C. K. Choi, Editor, (IEEE, NY, 1981) 1601-1604.

Response of Zr-Al Getter Material to the Anticipated TFTR In-Torus Environment, B. Ferrario, M. Borghi, J. L. Cecchi, and J. J. Sredniawski, *Proceedings of the Eleventh Symposium on Fusion Technology (Pergamon Press, New York, 1981) Vol. 1*, p. 375-383.

TFTR Impurity Control Prototype Tests, J. L. Cecchi, H. F. Dylla, R. J. Fonck, R. J. Knize, H. W. Kugel, M. Okabayashi, D. K. Owens, M. Ulrickson, and J. J. Sredniawski, *Proceedings of IAEA Technical Committee Meeting on Divertors and Impurity Control*, edited by M. Keilhacker and U. Daybelge (Max-Planck-Institut fur Plasmaphysik, Garching, 1981) p. 97.

Compatibility of the Zr-Al Alloy With a Tokamak Plasma Environment, R. J. Knize, J. L. Cecchi, and H. F. Dylla, *J. Nucl. Mater.* **103/104**, 539-543 (1981).

Surface Analysis of TFTR Vacuum Vessel Samples Subjected to the Post-Weld Heat Treatment, R. L. Moore, S. A. Cohen, J. L. Cecchi, and H. F. Dylla, *J. Vac. Sci. Technol.* **18**, 1072 (April 1981).

Anomalies in the Beam-Foil Measurements for $n=0$ Transitions in Highly Ionized Members of the Li, Na, and Cu Sequences, B. M. Johnson, D. C. Gregory, K. W. Jones, D. J. Pegg, P. M. Griffin, T. H. Kruse, J. L. Cecchi, and J. O. Ekberg, *IEEE Trans. Nucl. Sci.* **NS-28**, 1159-1161 (April 1981).

The Effect of Hydrogen Glow Discharge Conditioning on Zr/Al Getter Pumps, H. F. Dylla, J. L. Cecchi, and M. Ulrickson, *J. Vac. Sci. Technol.* **18**, 1111-1113 (April 1981).

Design of TFTR Movable Limiter Blades for Ohmic and Neutral Beam Heated Plasmas, D. W. Doll, M. Ulrickson, J. L. Cecchi, J. C. Citrolo, D. Weissenburger, and J. Bialek, *Proceedings of the 9th Symposium on Engineering Problems in Fusion Research*, C. Choi, editor, (IEEE, N.Y. 1981) p. 1654-1657.

Tokamak Limiter Design, J. L. Cecchi, *Proceedings of the 9th Symposium on Engineering Problems in Fusion Research*, C. K. Choi, editor, (IEEE, N.Y. 1981) p 1378-1382.

Measurement of H₂, D₂ Solubilities in Zr-Al, R. J. Knize, J. L. Cecchi, and H. F. Dylla, *J. Vac. Sci. Technol.* **20**, 1135-1137 (April 1982).

Changes in Tokamak Plasma Properties During Impurity Injection, S. A. Cohen, J.L. Cecchi, C. C. Daughney, S. L. Davis, D. L. Dimock, P. C. Efthimion, M. Finkenthal, R. J. Fonck, E. Hinnov, R. A. Hulse, D. W. Johnson, D. M. Manos, D. H. McNeill, S. S. Medley, E. B. Meservey, D. Mueller, J. F. Schivell, E. H. Silver, S. Suckewer, J. R. Timberlake and S. von Goeler, *J. Vac. Sci. Technol.* **20**, 1226-1229 (April 1982).

Beam-Foil Spectra for 15-160 MeV Zr-Al Wavelengths from 6-60 nm, T. H. Kruse, J.L. Cecchi, B. M. Johnson, D. C. Gregory and K. W. Jones, *Phys. Lett. A*, **90A**, 284-287 (July 1982).

Reduction of Recycling by Pumping at the PDX Limiter, J. L. Cecchi, R. J. Knize, H. F. Dylla, R. J. Fonck and D. K. Owens, *J. Nucl. Mater.* **111/112**, 305-310 (October 1982).

Diffusion of Hydrogen and Deuterium in Zr-Al, R.J. Knize and J. L. Cecchi, *J. Nucl. Mater.* **111/112**, 645-647 (October 1982).

Impurity Levels and Power Loading in the PDX Tokamak with High Power Neutral Beam Injection, R. J. Fonck, M. G. Bell, K. Bol, K. Brau, R. Budny, J. L. Cecchi, S. A. Cohen, S. L. Davis, H. F. Dylla, R. J. Goldston, B. Grek, R. J. Hawryluk, J. Hirschberg, D. W. Johnson, R. A. Hulse, R. Kaita, S. M. Kaye, D. K. Owens, R.J. Knize, H. W. Kugel, D. M. Manos, D. K. Mansfield, K. McGuire, D. Mueller, K. Oasa, M. Okabayashi, G. L. Schmidt, S. Sesnic, S. Suckewer, H. Takahashi, F. H. Tenney, P. Thomas, M. Ulrickson, and R. V. Yelle, *J. Nucl. Mater.* **111/112**, 343-354 (November/December 1982).

Pressure Dependence of Zr-Al Pumping Speed for H₂, J. L. Cecchi and R. J. Knize, *J. Vac. Sci. Technol.* **A1**, 1276-1278 (April/June 1983).

Enhanced Selective Hydrogen Desorption from Metals, R. J. Knize and J. L. Cecchi, *J. Vac. Sci. Technol.* **A1**, 1273-1275 (April/June 1983).

Theory of Bulk Gettering, R. J. Knize and J. L. Cecchi, *J. App. Phy.* **54**, 3183-3189 (June 1983).

Modeling the Coupling of Magnetodynamics and Elastomechanics in Structural Analysis, J. Bialek, D. Weissenberger, M. Ulrickson and J. L. Cecchi, *Proceedings of the Tenth Symposium on Fusion Engineering*, 51-5 (1984).

Phenomenology of Bulk Gettering, R. J. Knize and J. L. Cecchi, *Fus. Technol.* **6**, 503-510 (September 1984).

Gettering in Fusion Devices, J. L. Cecchi and R. J. Knize, *J. Vac. Sci. Technol.*, **A2**, 1214-1221 (April 1984).

Spin Exchange Optical Pumping to Produce Large Amounts of Polarized Nuclei, W. Happer, E. Miron, R. Knize, and J. Cecchi, *Proceedings of Polarized Proton Ion Sources Vancouver, Canada, May 1983*, AIP Conference Proceedings No 117, (American Institute of Physics, 1984) 114-121.

Initial Limiter and Getter Operation on TFTR, J. L. Cecchi, et al., *J. Nucl. Mater.* **128/129**, 1-9 (1984).

Tritium Inventory and Permeation in TFTR, M. I. Baskes, K. L. Wilson, D. K. Brice, B. L. Doyle, W. R. Wampler, D. B. Heifetz, H. F. Dylla, and J. L. Cecchi, *J. Nucl. Mater.* **128/129**, 629 (1984).

TFTR Initial Operations, K. M. Young, M. G. Bell, W. R. Blanchard, N. L. Bretz, J. L. Cecchi, J. Coonrod, S. L. Davis, H. F. Dylla, P. C. Efthimion, R. J. Fonck, R. J. Goldston, D. J. Grove, R. J. Hawryluk, H. W. Hendel, K. W. Hill, J. Isaacson, L. C. Johnson, R. Kaita, R. B. Krawchuk, R. Little, M. P. McCarthy, D. C. McCune, K. McGuire, D. M. Meade, S. S. Medley, D. Mikkelson, D. Mueller, E. Nieschmidt, D. K. Owens, A. T. Ramsey, A. L. Roquemore, L. E. Samuelson, N.R. Sauthoff, J. F. Schivell, J. A. Schmidt, S. Sesnic, J. Sinnis, J. D. Strachan, G. D. Tait, G. Taylor, F. H. Tenney, and M. Ulrickson, *Plasma Physics and Controlled Fusion* **26**, 11 (January 1984).

Measurement of the Hydrogenic Recombination Coefficient for the TFTR Vacuum Vessel, H. F. Dylla, J. L. Cecchi, R. J. Knize, *J. Nucl. Mater.*, **121**, 243-248 (March 1984).

Thermal Loads on the Ignitor Limiter for Elongated Plasmas, J. L. Cecchi and B. Coppi, *J. Nucl. Mater.*, **121**, 449-452 (March 1984).

Recent Results from TFTR, R. J. Hawryluk, M. G. Bell, M. Bitter, W. R. Blanchard, N. Bretz, C. Bush, J. L. Cecchi, et al., *Proceedings of Fourth International Symposium on Heating in Toroidal Plasmas, Rome, Italy, (March 1984)* edited by H. Knoepfel and E. Sindoni, Vol. II, pp. 1012-1031.

Power Handling and Particle Control in TFTR, R. J. Hawryluk, J. L. Cecchi, H. F. Dylla, R. J. Knize, R. Little, D. K. Owens, and M. Ulrickson, Proceedings of the Fourth International Symposium on Heating in Toroidal Plasmas, Rome, Italy, (March 1984) edited by H. Knoepfel and E. Sindoni, Vol. II, p. 1374.

Diffusion of Hydrogen and Deuterium in ZrVFe, R. J. Knize, J. L. Stanton, and J. L. Cecchi, *J. Nucl. Mater.*, **122/123**, 1553-1557 (April 1984).

Initial Confinement Studies of Ohmically Heated Plasmas in the Tokamak Fusion Test Reactor, P. C. Efthimion, M. G. Bell, W. R. Blanchard, N. L. Bretz, J. L. Cecchi, et al., *Phys. Rev. Letters*, **52**, 1492-1495 (April 1984).

Optical Pumping Production of Spin Polarized Hydrogen, R. J. Knize, W. Happer, and J. L. Cecchi, Proceedings of the Workshop on Polarized Targets in Storage Rings Argonne, IL, (May 1984).

Neutral Beam Heating in TFTR-Projections and Initial Results, H. P. Eubank, J. Bell, M. G. Bell, M. Bitter, W. R. Blanchard, F. Boody, D. Boyd, N. Bretz, C. Bush, J. L. Cecchi, et al. Proc. Tenth International Conference on Plasma Physics and Controlled Nuclear Fusion Research IAEA-CN-44/A-V-3, 27 pp. London, UK, 12-19 (September 1984).

Confinement Studies of Ohmically-Heated Plasmas in TFTR, P. C. Efthimion, N. L. Bretz, M. G. Bell, M. Bitter, W. R. Blanchard, F. P. Boody, D. Boyd, C. E. Bush, J. L. Cecchi, et al. Tenth International Conference on Plasma Physics and Controlled Nuclear Fusion Research London, UK, September 1984, Paper IAEA-CN-44/A-I-2 1 (September 1984).

Adiabatic Toroidal Compression and Free-Expansion Experiments in TFTR, G. D. Tait, J. Bell, M. G. Bell, M. Bitter, W. R. Blanchard, F. P. Boody, D. Boyd, N. L. Bretz, C. E. Bush, J. L. Cecchi, et al., Tenth International Conference on Plasma Physics and Controlled Nuclear Fusion Research, London, UK, September 1984, Paper IAEA-CN-44/A-III-1 (September 1984).

Technique for In Vacuo Inerting of ZrAl Alloy Bulk Getters, J. L. Cecchi, P. H. LaMarche, H. F. Dylla, and R. J. Knize, *J. Vac. Sci. Technol.* **A3**, 487 (1985).

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Remote Plasma Assisted Atomic Layer Deposition of Ultra-thin Pore-sealing for Self-assembled Porous Low-k Materials Ying-Bing Jiang, George Xomeritakes, Zhu Chen, Darren Dunphy, Jiebin Pang, Eric Branson, Joseph L. Cecchi and C. Jeffrey Brinker, Materials Research Society, 2007 Spring Meeting, April 10-12, 2007, San Francisco, CA., B1-4.

Ultra- Thin Conformal Pore-Sealing of Low-K Materials by Plasma-Assisted ALD, [INVITED] Joseph L. Cecchi, C. Jeffrey Brinker, and Ying-Bing Jiang, Third symposium on Atomic Layer Deposition Applications, 212th Electrochemical Society Meeting, Washington, DC, October 7 - 12, 2007.

INVITED PRESENTATIONS AND SEMINARS

- Dartmouth College, Mar., 1972.
- Trenton State College, Nov., 1973.
- East Stroudsburg State College, Dec., 1973.
- Lehigh University, Nov., 1974.
- East Stroudsburg State College, Nov., 1974.
- Joint USSR-USA Workshop on the Problems of Impurities, Divertors, Walls, and Limiters, Kurchatov Institute of Atomic Energy, Moscow, USSR, May, 1975.

- Massachusetts Institute of Technology, Sept., 1975.
- Columbia University, April, 1976.
- Seventh Annual Symposium on Applied Vacuum Science and Technology (American Vacuum Society), Tampa, FL, Feb., 1978.
- Fourth International Conference on Plasma Surface Interactions in Controlled Fusion Devices, Garmisch-Partenkirchen, Federal Republic of Germany, April, 1980.
- 9th Symp. on Engineering Problems in Fusion Devices, Chicago, IL., Nov., 1981.
- Gordon Conference on Atomic Physics, New London, NH, July, 1983.
- Third Topical Meeting on Fusion Reactor Materials, Albuquerque, NM, Sept., 1983.
- 30th National Symposium, American Vacuum Society, Boston, MA, Nov., 1983.
- Sixth International Conference on Plasma Surface Interactions in Controlled Fusion Devices, Nagoya, Japan, May, 1984.
- 10th Intern. Vacuum Congress, 6th Intern. Conference on Solid Surfaces, and 33rd National Symposium, American Vacuum Society, Baltimore, MD., Oct., 1986.
- University of Virginia, April, 1988.
- Princeton University, Department of Chemical Engineering, Oct., 1988.
- IBM, East Fishkill, NY, Mar., 1989.
- AT&T Bell Laboratories, Murray Hill, NJ, June, 1989.
- 7th American Physical Society Topical Conference on Atomic Processes in Plasmas, Gaithersburg, MD., Oct., 1989.
- Princeton University, Plasma Physics Laboratory, Nov., 1989.
- SEMATECH, Austin, TX, Jan., 1990.
- AT&T Bell Laboratories, Allentown, PA, Feb., 1990.
- Hercules Advanced Materials and Systems, Wilmington, DE, June, 1990.
- Princeton University, Plasma Physics Laboratory, April, 1991.
- IBM, East Fishkill, NY, April, 1991.
- IBM, Burlington, VT, April, 1991.
- University of New Mexico, Department of Chemical and Nuclear Engineering, Albuquerque, NM, Feb., 1992.
- SEMATECH, Austin, TX, Mar., 1992.
- Princeton University, Department of Electrical Engineering, April, 1992.
- Rutgers University, Department of Physics, May, 1992.
- SEMATECH, Etch Focus Technical Advisory Board, Austin, TX, July, 1992.
- 14th Dry Process Symposium, Tokyo, Japan, Oct., 1992.
- Princeton University, Department of Chemical Engineering, Dec., 1992.
- North Carolina State University, Center for Advanced Electronic Materials Processing, Raleigh, NC, Mar., 1993.
- University of New Mexico, Department of Chemical and Nuclear Engineering, Albuquerque, NM, May, 1993.
- American Vacuum Society, New Mexico Chapter Meeting, April, 1994.
- Tegal Symposium, San Francisco, CA, July 1995
- IUVSTA Workshop on Plasma Sources and Surface Interactions in Materials Processing, Fuji-Yoshida, Japan, Sept., 1995
- 13th International Vacuum Congress and 9th International Conference on Solid Surface, Yokohama, Japan, Sept., 1995

- 42nd National Symposium, American Vacuum Society, Minneapolis, MN, Oct., 1995
- Lucent Technologies, Bell Laboratories, Mar., 1996
- Lam Research Corporation, Fremont, CA, July, 1996
- Intel Corporation, Rio Rancho, NM, Sept., 1996
- Plasma Etch Users' Group (PEUG) Meeting, Santa Clara, CA, Jan., 1997
- 45th International Symposium, American Vacuum Society, Baltimore, MD, November 1998.
- 35th Annual Symposium of the New Mexico Chapter of the American Vacuum Society, Albuquerque, NM, March 1999.
- The University of Texas at Austin, Department of Chemical Engineering, September, 1999.
- Texas Tech University, Department of Physics, October, 1999.
- The University of California at Los Angeles (UCLA), Department of Chemical Engineering, May, 2000.
- The Gordon Research Conference on Plasma Processing Science, Tilton, NH, August, 2000.
- The University of Wisconsin, Madison, April, 2001

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- Method of Enhancing Selective Isotope Desorption from Metals, U.S. Patent No. 4,476,100, Issued: October 9, 1984.
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- Method and Apparatus for Coupling a Microwave Source in an Electron Cyclotron Resonance System, U.S. Patent No. 5,111,111, Issued: September 30, 1991.
- Apparatus and Method for Uniform Microwave Plasma Processing Using TE₁₁ and TM₀₁ Modes, U.S. Patent No. 5,302,803, Issued: April 12, 1994.
- Apparatus and Process for Producing High Density Axially Extended Plasmas, U.S. Patent No. 5,587,038, Issued December 24, 1996.

CONSULTING

- Vista Scientific Corporation, Ivyland, PA
- Princeton Scientific Consultants, Princeton, NJ
- PA Consulting, East Windsor, NJ
- Argonne National Laboratory, Argonne, IL
- Maxwell Laboratories, San Diego, CA
- Eaton Corporation, Beverly, MA
- Ebasco Services, Incorporated, New York, NY
- EMCORE Corporation, Somerset, NJ
- SRI David Sarnoff Research Center, Princeton, NJ

- Materials Research Corporation, Orangeburg, NY
- Sigma Partners, Palo Alto, CA
- Samsung Semiconductor, Korea
- LG Semiconductor, Korea
- Lucent Technologies, Bell Labs, Murray Hill, NJ
- Hyundai Microelectronics, Korea
- Plasma Physics Corporation, Locust Valley, NY
- Intersil Corporation, Melbourne, FL
- Hynix Microelectronics, Korea
- Applied Materials Corporation, Santa Clara, CA
- Agere Systems, Allentown, PA

OTHER PROFESSIONAL ACTIVITIES

- Visiting Associate Physicist, Brookhaven National Laboratory, 1976-78.
- U.S. Department of Energy Steering Committee on the Development of Advanced Limiters in Fusion Devices, 1981-83.
- Program Chairman, Symposium on Energy Removal and Particle Control in Fusion Devices, Princeton, NJ, July 26-29, 1983.
- Guest Editor, Journal of Nuclear Materials, 1983, 1986.
- Advisory Committee, North Carolina State University, Department of Nuclear Engineering, 1985-87.
- U.S. Department of Energy, Magnetic Fusion Advisory Committee (MFAC) Panel on DOE Technical Planning Document, 1986-87.
- Program Council, New Jersey Advanced Technology Center for Surface Engineered Materials, 1987 - 94.
- Executive Committee, New Jersey Advanced Technology Center for Photonic and Optoelectronic Materials, 1988 - 94.
- Plasma Etching Roadmap Committee, Semiconductor Research Corp., 1988-89.
- Program Chairman, Topical Research Conference on Plasma Etching, Princeton, NJ, May 14-15, 1992.
- Semiconductor Industry Association Roadmap Committee, 1992-93.
- Semiconductor Industry Association National Technology Roadmap for Semiconductors: Interconnect Technical Working Group (TWG), 1993-97
- Program Committee, Dry Process Symposium, Tokyo, Japan, 1994.
- Program Committee, 3rd Inter. Conf. Reactive Plasmas/14th Symp. Plasma Processing, Nara, Japan, 1997.
- Advisory Council, Program in Plasma Physics, Princeton University, 1997-01.
- Semiconductor Industry Association International Technology Roadmap for Semiconductors (ITRS): Interconnect Technical Working Group (TWG), 1998-2000.
- Program Committee, Division of Plasma Science and Technology, AVS Annual Symposium Program Committee, 1999-2000.
- Program Co-Chair, New Mexico American Vacuum Society Annual Symposium, Albuquerque, NM, May 24-25, 2000.

- Program Co-chair, Plasma Processing, American Institute of Chemical Engineers (AIChE) Annual Meeting, November 12-17, 2000, Los Angeles, CA
- Program Chair, Plasma Science and Technology Division, 15th International Vacuum Congress, San Francisco, CA, Oct. 29 - Nov. 2, 2001.
- Director, The Science and Technology Corporation at the University of New Mexico, 2001 – present; Chairman of the Board, August 2004 – present
- Education Advisory Group, National Society of Professional Engineers, 2002 – present.
- Member, Next Generation Economic Initiative Microsystems Cluster, 2002 - 2004
- Member, National Aeronautics and Space Administration (NASA), Office of Aeronautics, Council of Deans, 2004 - 2005
- Honorary Commander and Senior Advisor to the leadership of Kirtland Air Force Base, 2004 - 2007

PROFESSIONAL ASSOCIATIONS

- American Association for the Advancement of Science (AAAS)
- American Institute of Chemical Engineers (AIChE)
- American Physical Society (APS)
- American Society of Engineering Education (ASEE)
 - Member, Engineering Deans Council (EDC), (2000 – present)
 - Director, EDC Executive Board (2006 – present)
 - Chair, EDC K-12 Task Force (2006-present)
 - Member, EDC Public Policy Committee, (2001 – present)
 - Member, EDC Data Collection Committee, (2005 – present)
 - Member, Engineering Deans' Institute Program Committee (April 2005)
- American Vacuum Society (AVS)
 - National Symposium Program Committee, (1981-83, 1986-87, 1991-95)
 - Executive Committee, Division of Plasma Science and Technology, (1991-95)
 - Chair, Division of Plasma Science and Technology, (1994)
- Council for Advancement and Support of Education (CASE)
- Electrochemical Society (ECS)
- International Society for Optical Engineering (SPIE)
- Women in Engineering and Programs Advocates Network (WEPAN)

HONORS AND AWARDS

- Phi Beta Kappa
- Sigma Xi
- National Science Foundation Pre-doctoral Fellow, 1968-72
- IBM Faculty Development Award, 1988
- Semiconductor Research Corporation Inventor Award, 1992, 1994
- Listed in Who's Who in Science and Engineering

- Listed in Who's Who in Engineering Higher Education (WWEHE)